

Grounding and Bonding for EG4 6000EX-48

(Configurable Firmware version 63.24 and beyond)

In June 2023, EG4 announced a significant update to how the firmware for the 6000ex inverters handle grounding and bonding.

Video Announcement: https://www.youtube.com/watch?v=FPYwoj3U_ss&t=30s

Rather than having separate mobile and stationary versions of the firmware, version 63.24 and beyond will have a setting (Program 34) that allows the user to select whether the inverter should behave as a stationary ‘common neutral’ system or a mobile ‘dynamic bonding’ system.

Having a single, configurable firmware simplifies version tracking and testing of new versions of the firmware and makes it easier for the user to select the correct version for their needs.

Program 34 Description:

- The EG4 6000-EX will have two different modes in the firmware that is controlled by Program 34 in the settings.
 - 1. Stationary mode for house or cabin - Program 34 Enabled**
 - The firmware will leave the input and output neutral connected at all times.(Note 2)
 - When in Passthrough mode the output hot will be connected to the input hot
 - When in Battery/inverter mode, the output hot will be connected to the inverter
 - The inverter will never create an N-G bond regardless of whether the bonding screw is installed.
 - 2. Mobile Mode for RV or boat - Program 34 Disabled (Default)**
 - When in Passthrough mode:
 - the output neutral will be connected to the input neutral
 - the output hot will be connected to the input hot
 - the inverter will not create an N-G bond on the output
 - When in Battery/inverter mode,
 - the output neutral will be connected to the inverter neutral
 - the output hot will be connected to the inverter
 - the inverter will create an N-G bond on the output if the bonding screw is installed.

NOTES:

- 1) For Program 34 to take effect, the inverter must be power-cycled after the change is made in the program.
- 2) When the inverter is powered off, the neutrals will be disconnected. However, if the inverter is powered on the neutrals will be connected in both battery mode and passthrough mode

LIMITATIONS:

Note: The following limitations were not discussed by the EG4 but are logical conclusions based on how the inverters operate.

Stacking inverters:

- When Program 34 is enabled (Stationary mode), the bonding relays are not used and therefore the relays do not impose a limit on stacking (There may be other limits though)
- When Program 34 is disabled (Mobile mode), the inverters should not be stacked.

Non-Neutral-switching transfer switches on the output.

- When Program 34 is enabled (Stationary mode), a non-neutral-switching transfer switch on the inverter output will work fine. This means the Reliant multi-circuit transfer switch is OK to use.
- When Program 34 is disabled (Mobile mode), a non-neutral-switching transfer switch could create two bonds when on battery power and therefore should not be used.

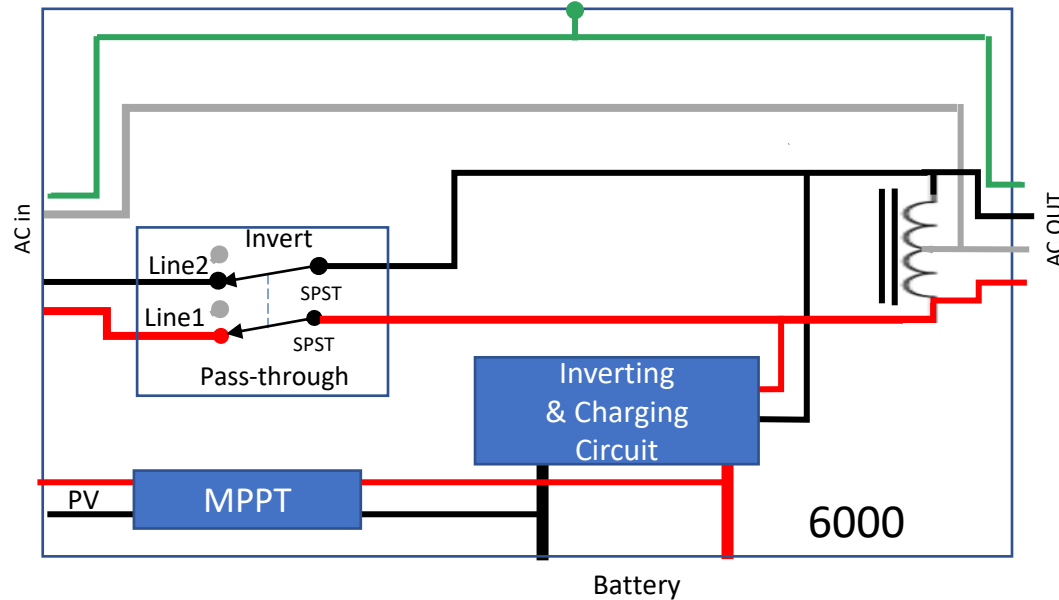
A Note about the bonding screw:

- In stationary mode, the unit will not create an NG Bond even if the bonding screw is installed.
- In Mobile mode, the bonding screw must be installed for the unit to create the N-G bond.

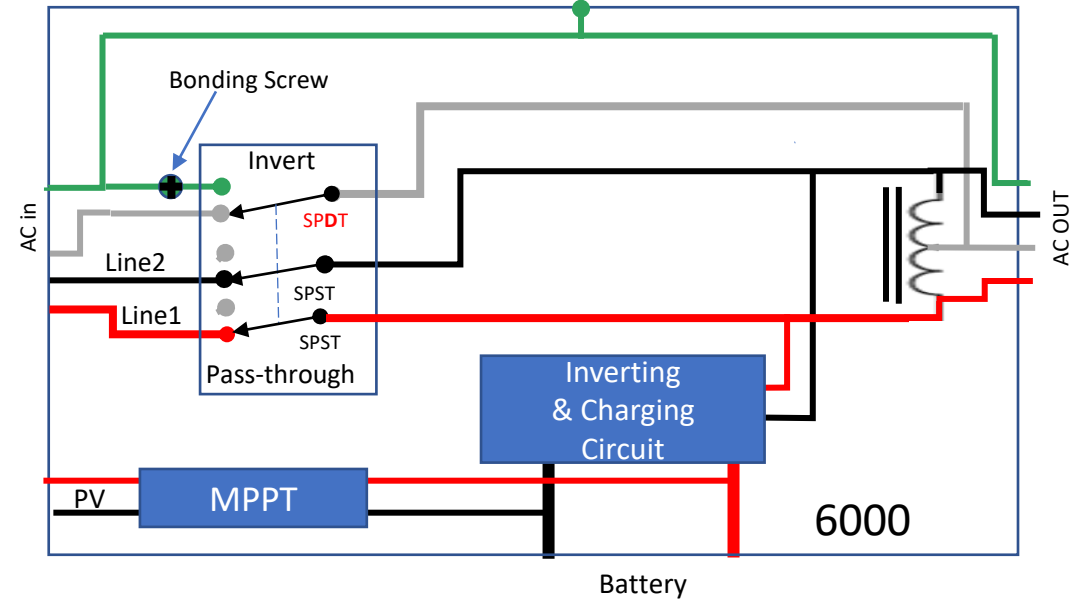
Therefore, there is never a need to remove the bonding screw on the 6000EX.

Inverter functional models

With the two different Modes in the firmware, the inverter must be modeled differently for each mode



Stationary Mode (Program 34 Enabled)

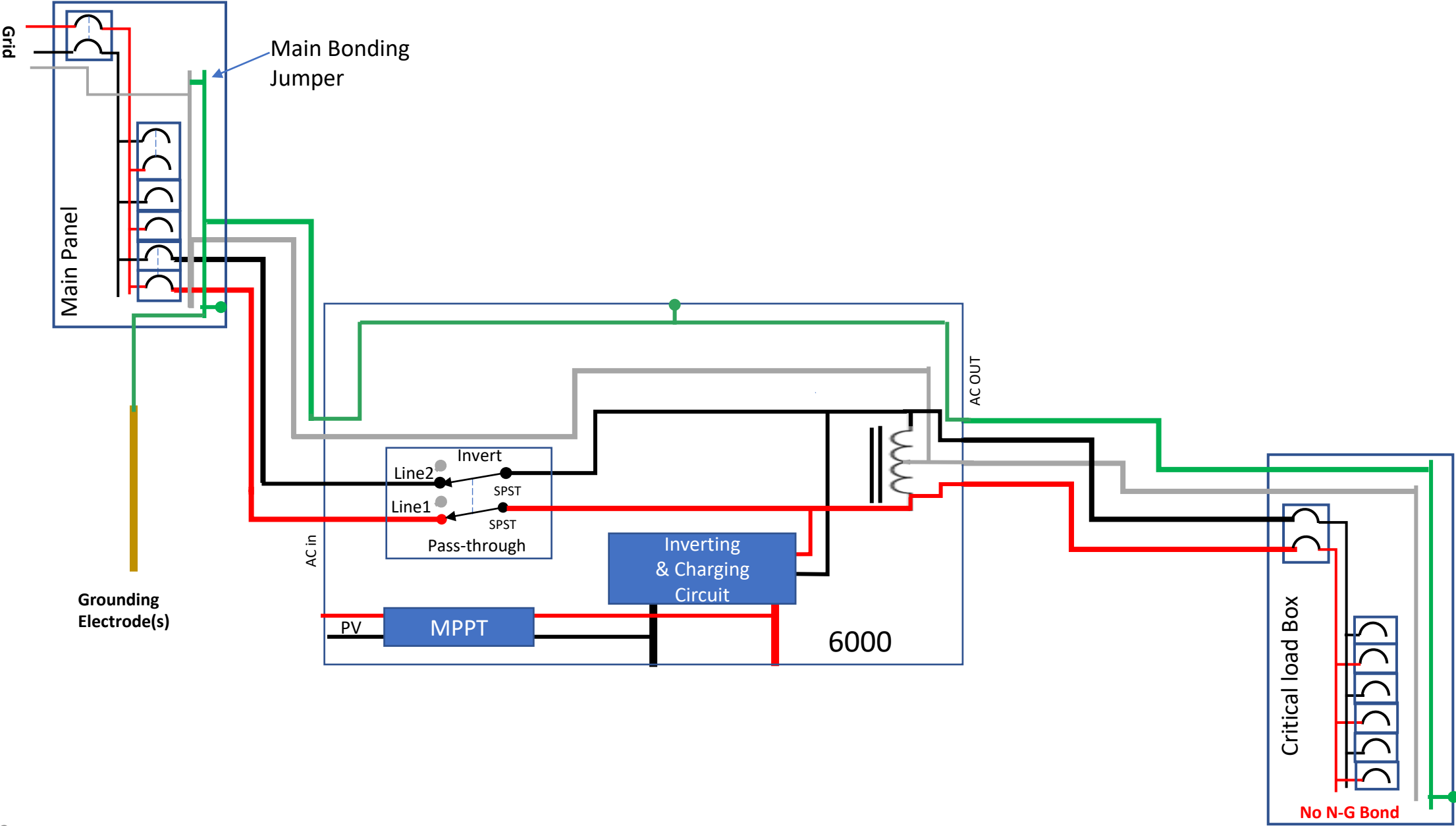


Mobile Mode (Program 34 Disabled)

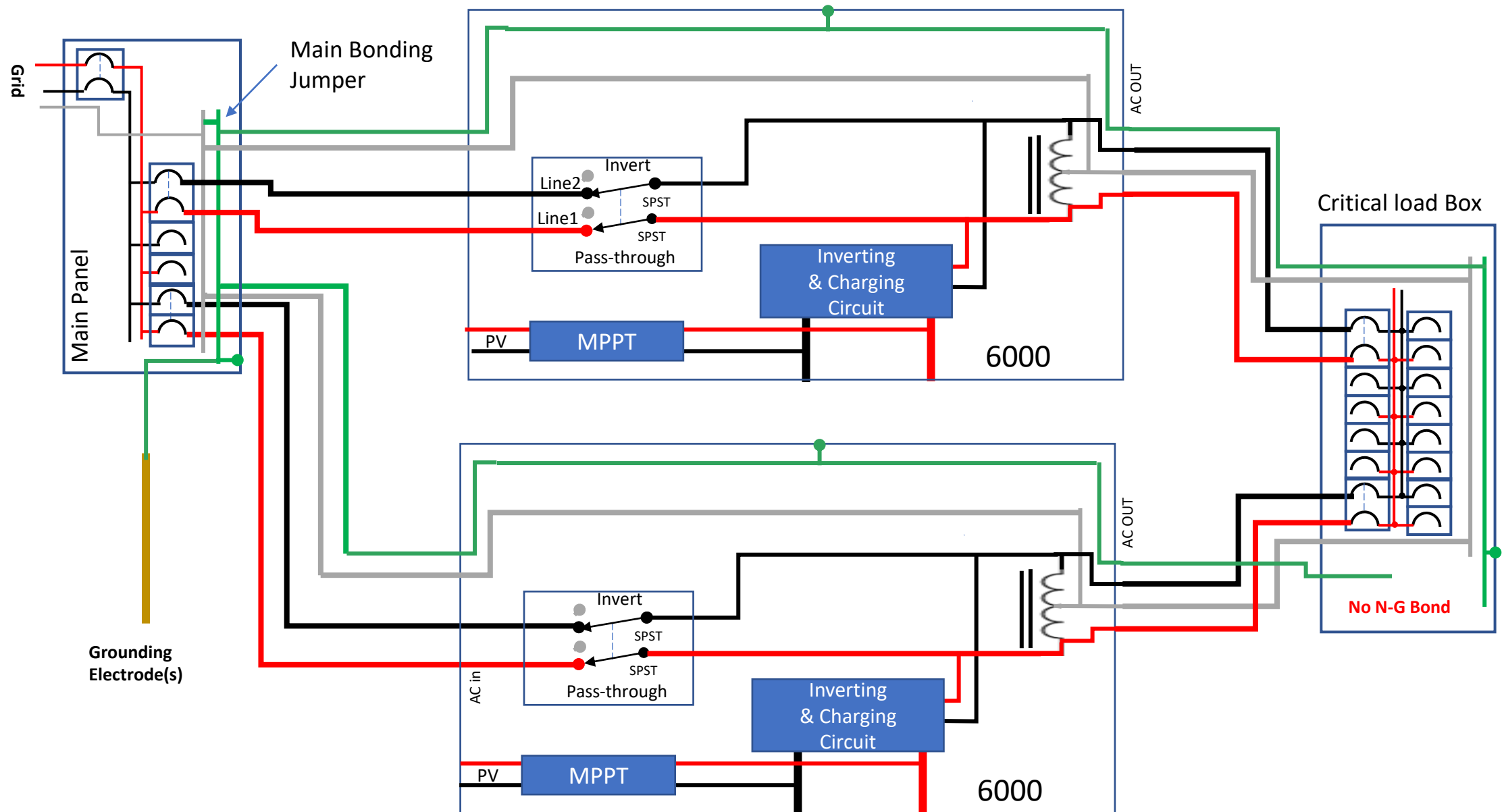
The remainder of this deck will be split into two different sections. One for configurations for Stationary mode and one for configurations for Mobile mode.

WARNING: These designs are based on the information EG4 has provided. However, I have not personally tested all of them.

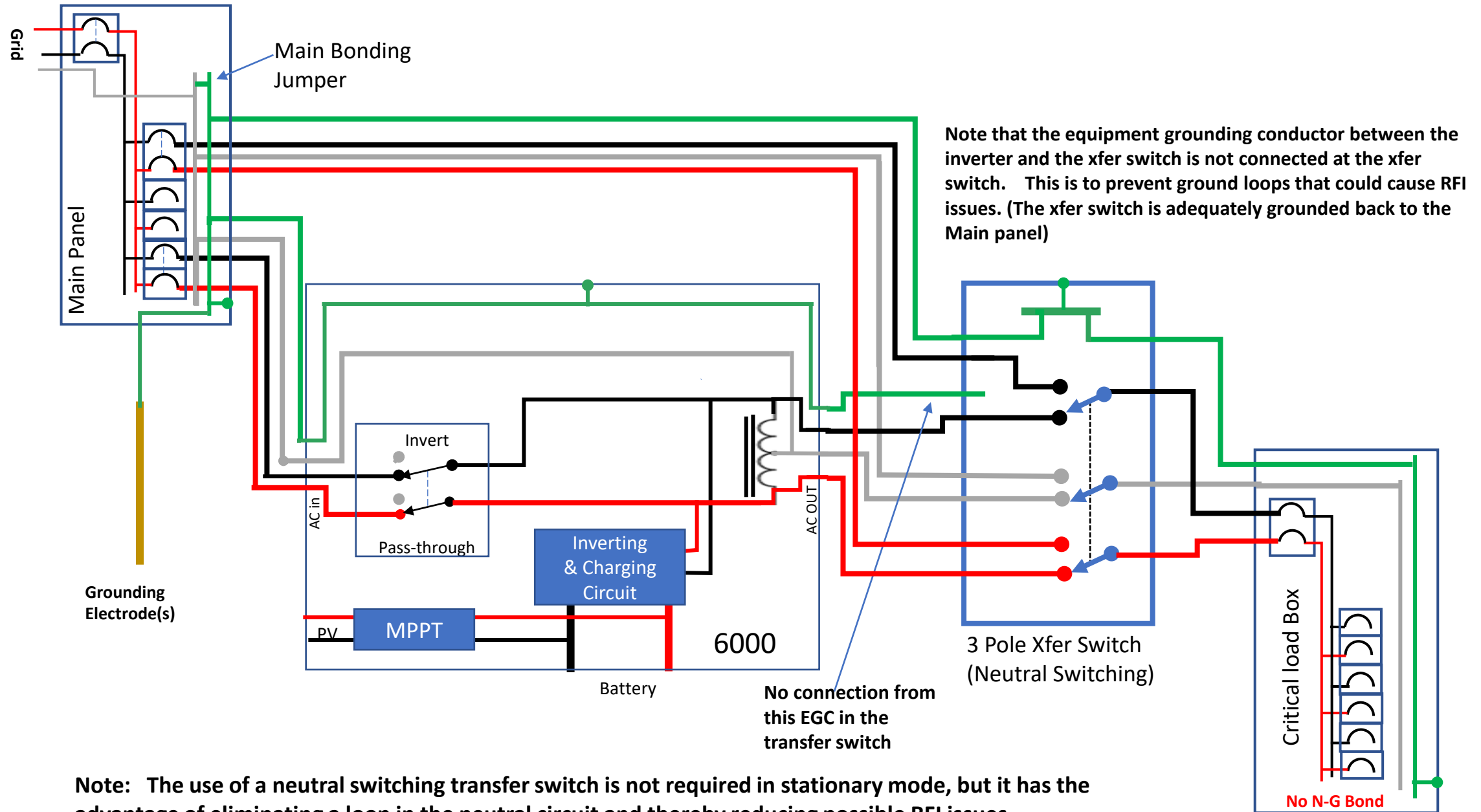
1 - Single inverter with grid - **Stationary Mode** (Program 34 Enabled)



2 - Dual inverter with grid - **Stationary Mode** (Program 34 Enabled)



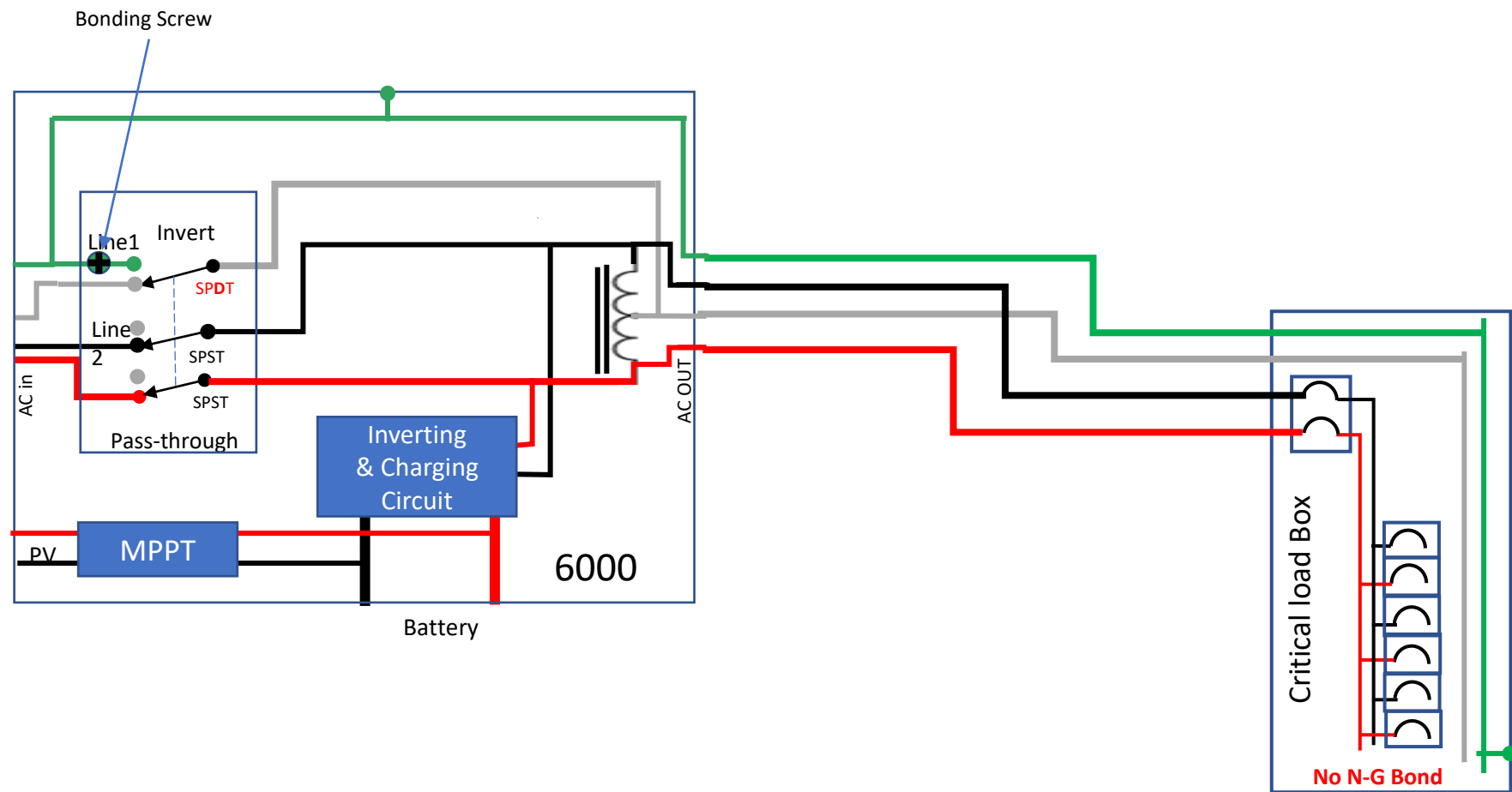
3 - Single inverter with grid and Neutral Switching bypass Xfer Switch – Stationary Mode (Program 34 Enabled)



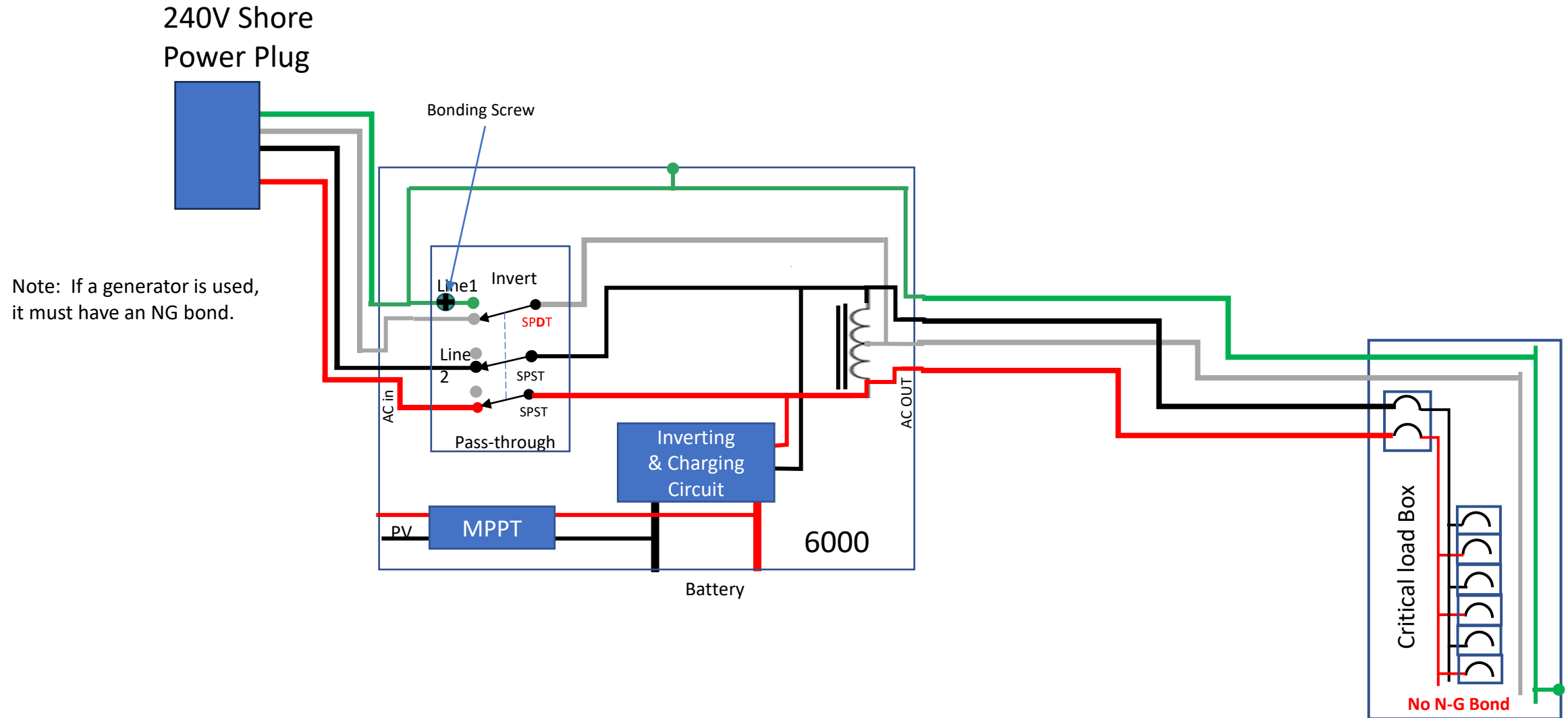
Note: The use of a neutral switching transfer switch is not required in stationary mode, but it has the advantage of eliminating a loop in the neutral circuit and thereby reducing possible RFI issues.

Configurations using Mobile mode (Program 34 Disabled)

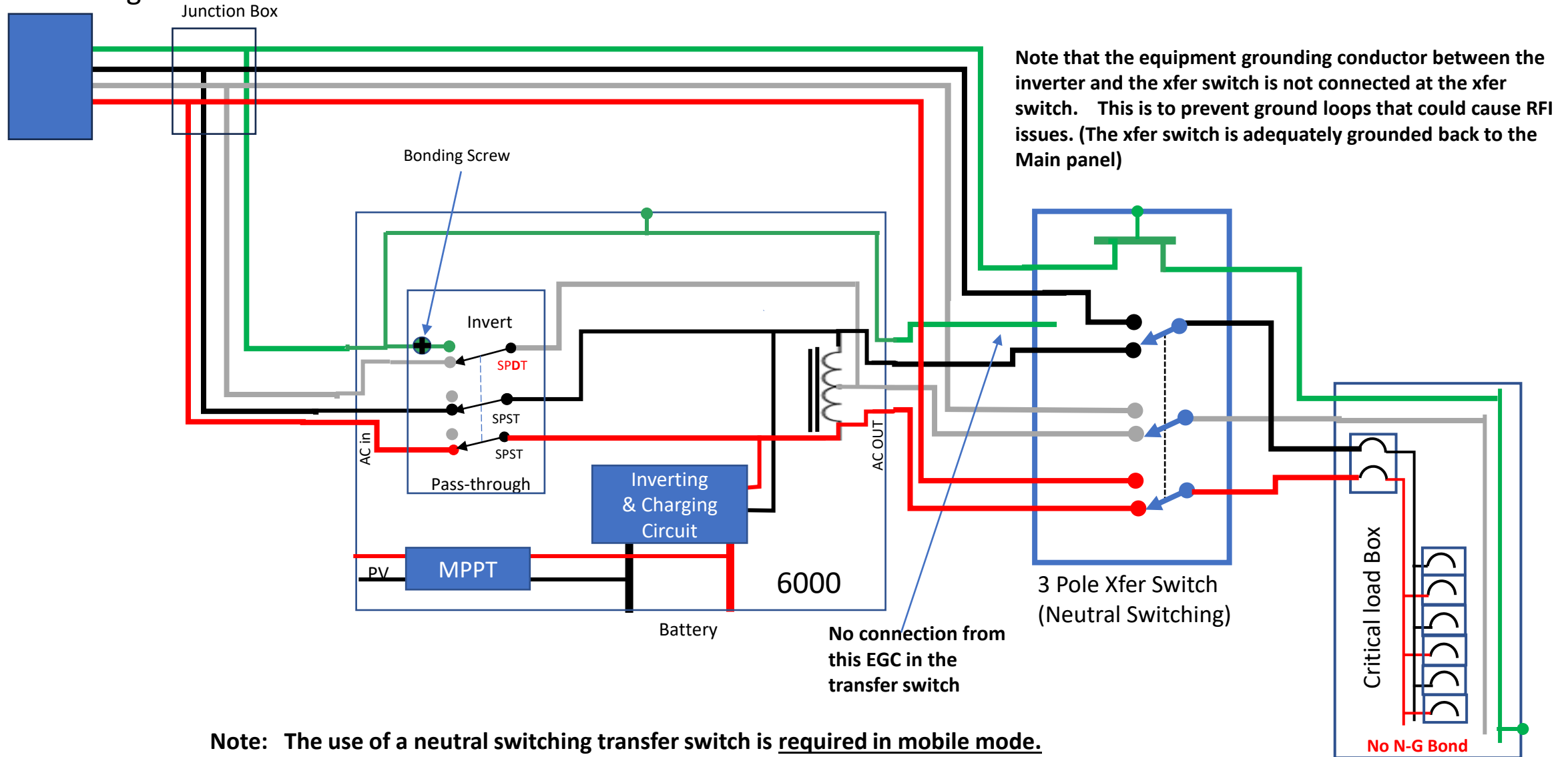
4 - Single inverter with no AC in - **Mobile Mode.** (Program 34 Disabled)



5 - Single inverter with shore power - **Mobile Mode** (Program 34 Disabled)



6 - Single inverter with shore power and Neutral Switching bypass Xfer Switch - **Mobile Mode** (Program 34 Disabled)



Note: The use of a neutral switching transfer switch is required in mobile mode.